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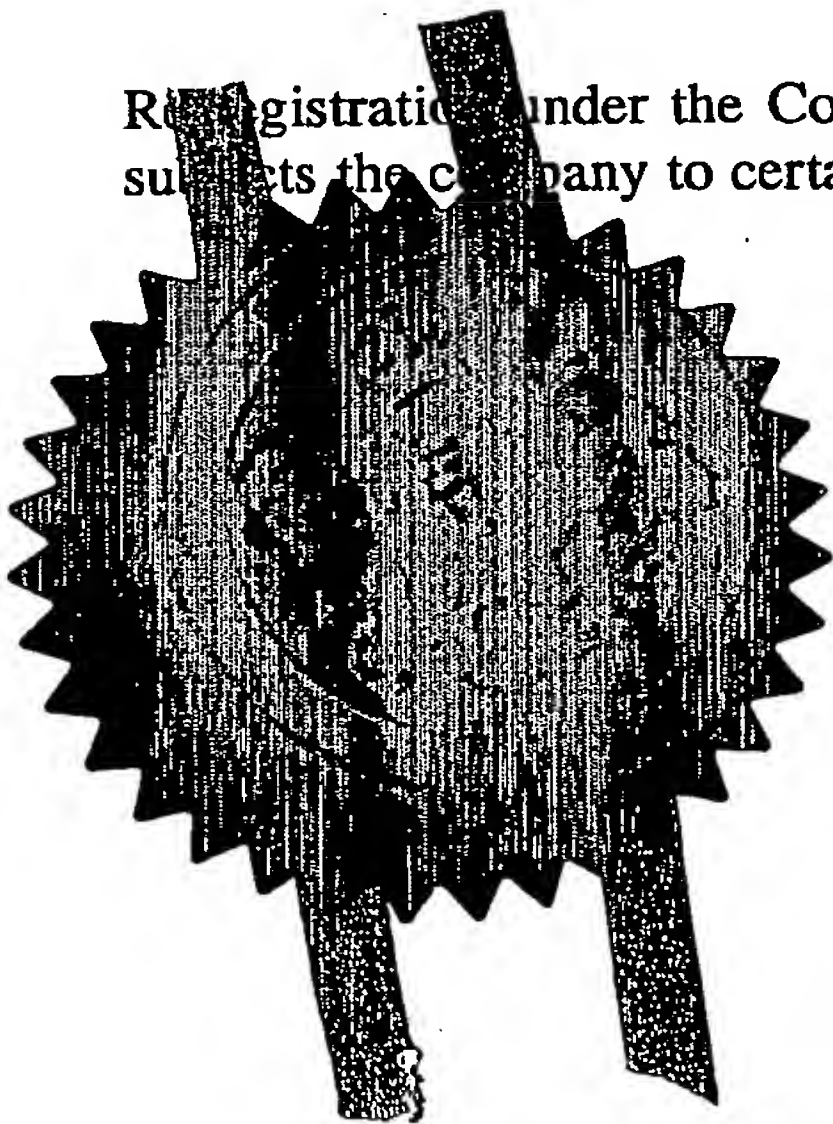
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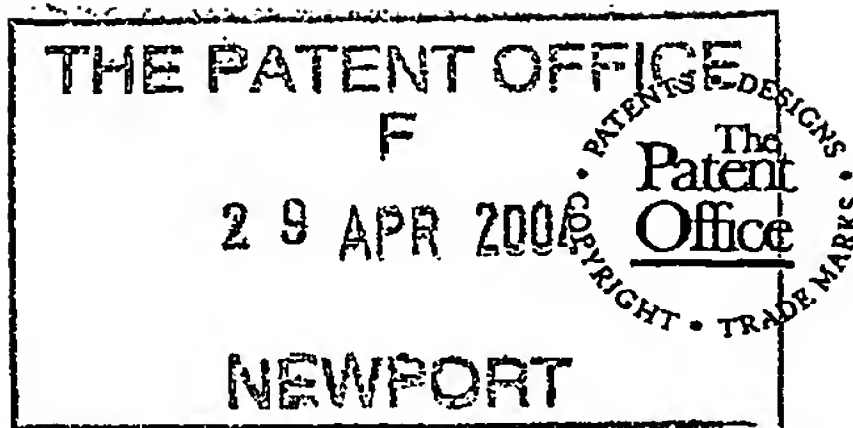
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29APR04 E892245-1 B20639
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3. Full name, address and postcode of the or of each applicant (underline all surnames)

DR KIN FAI KAM

12 BLAKENEY PLACE

YORK YO10 3HZ

08794968001

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

A COMPACT ELECTRONIC ACTIVITY REMINDER DEVICE

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

HARRISON GODDARD FOOTE

31 ST SAVIOURGATE

YORK

YO1 8NQ

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(51/77 18/1/05)

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Priority application number
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GB0401575.6

24/1/04

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Description

9 —

Claim(s)

Abstract

Drawing(s)

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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Signature(s)

K. F. Kam

Date 28/4/04

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

KIN P. KAM
01904 438798

kfkam@btopenworld.com

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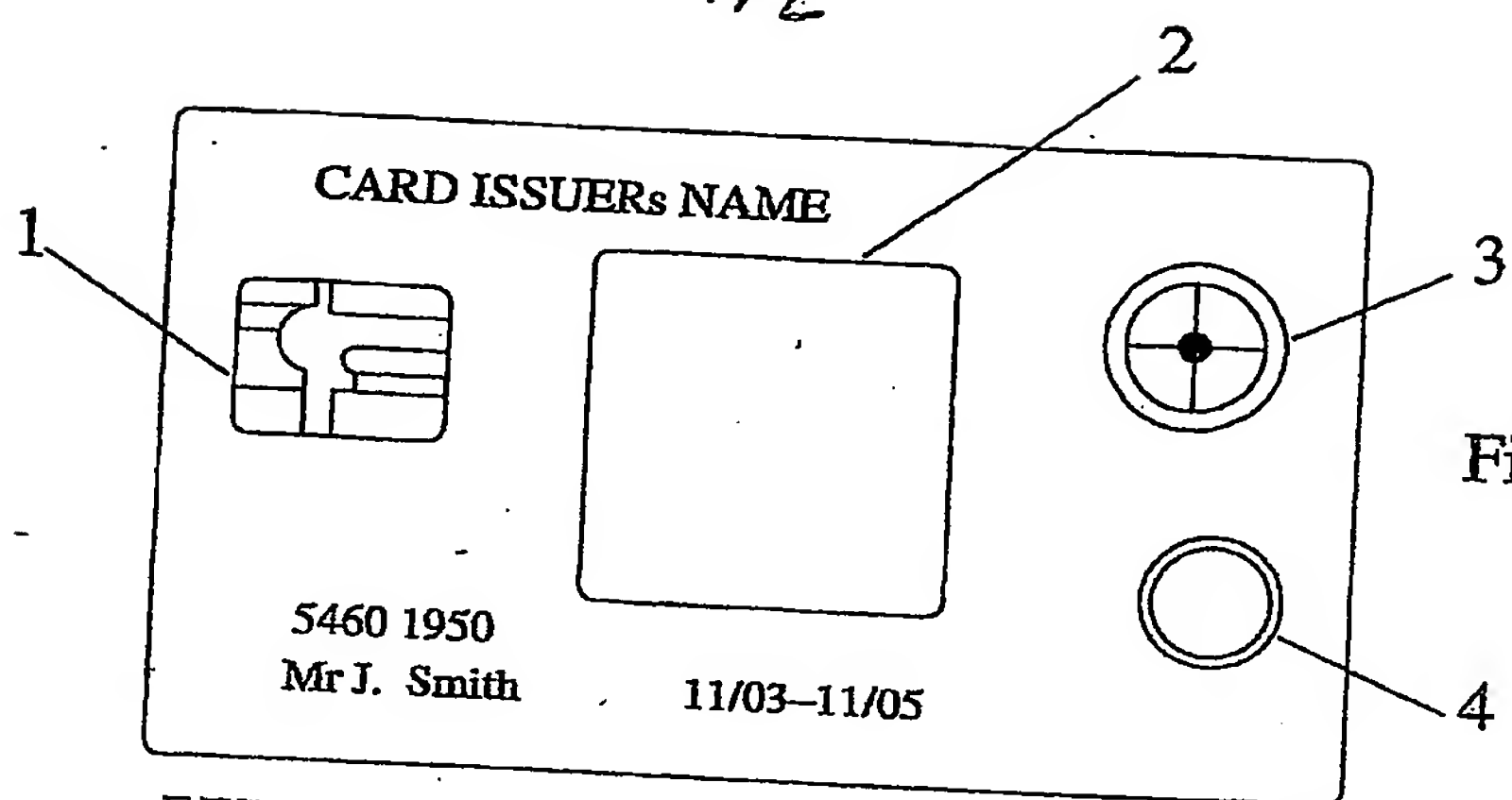


Fig. 1

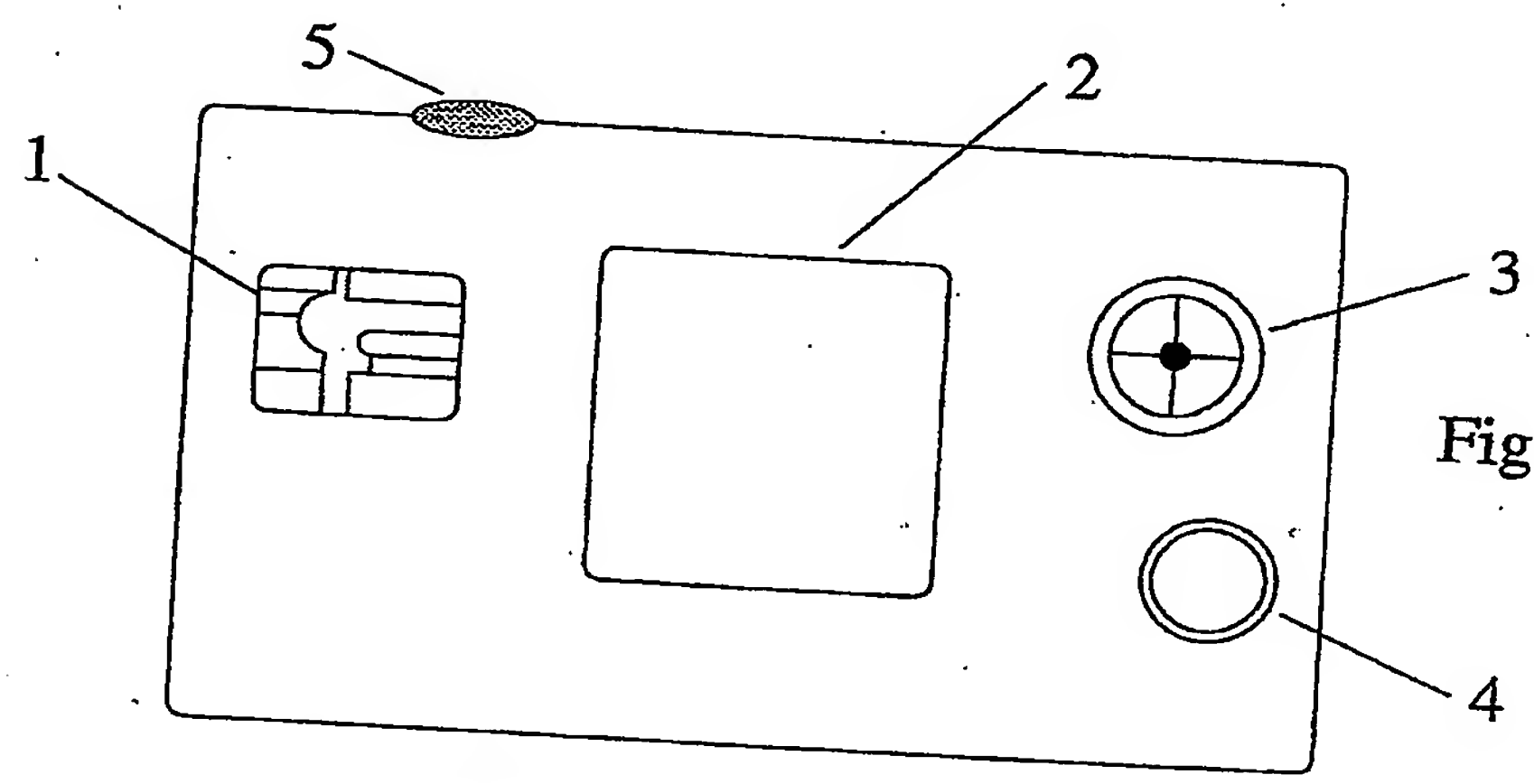


Fig. 2

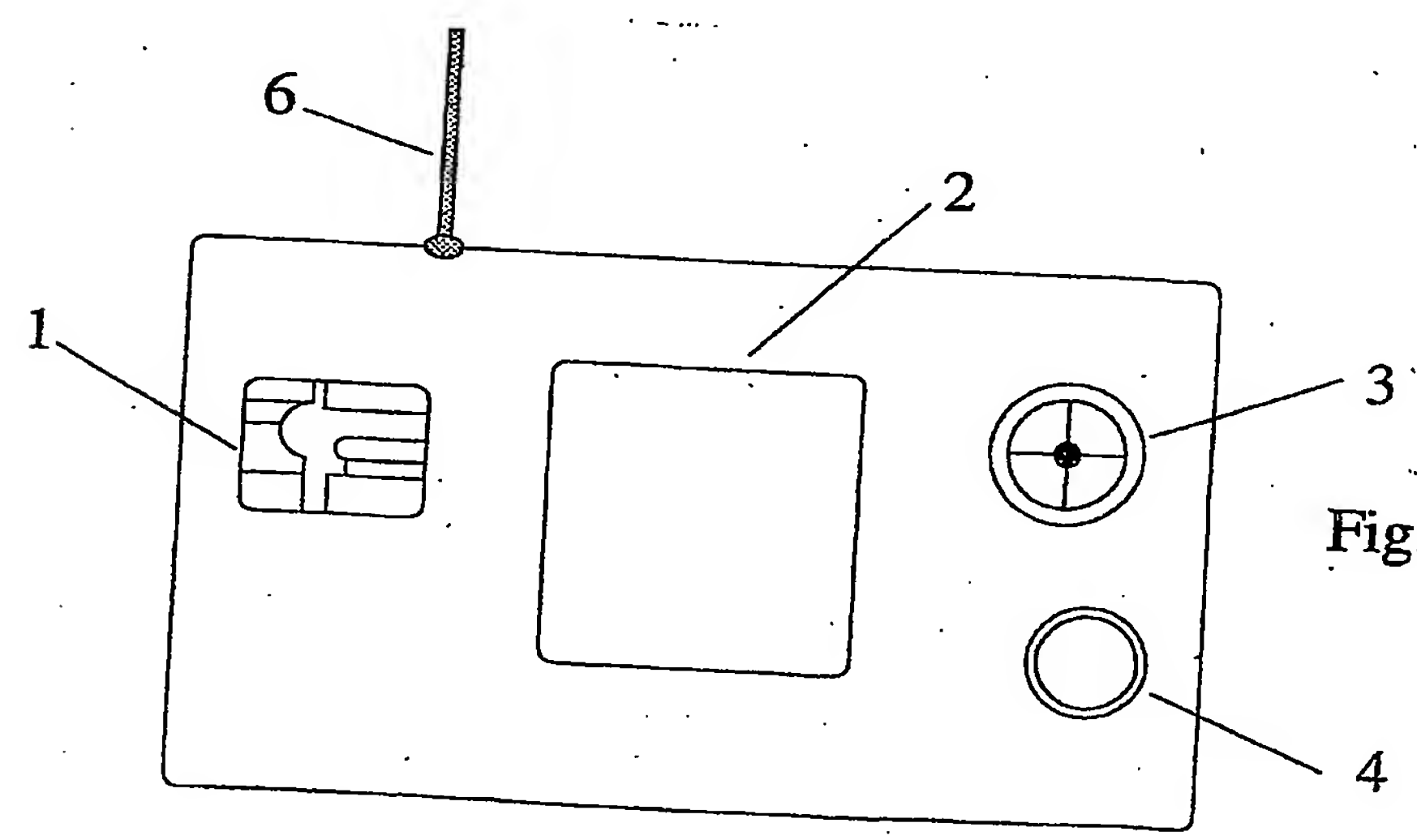


Fig. 3

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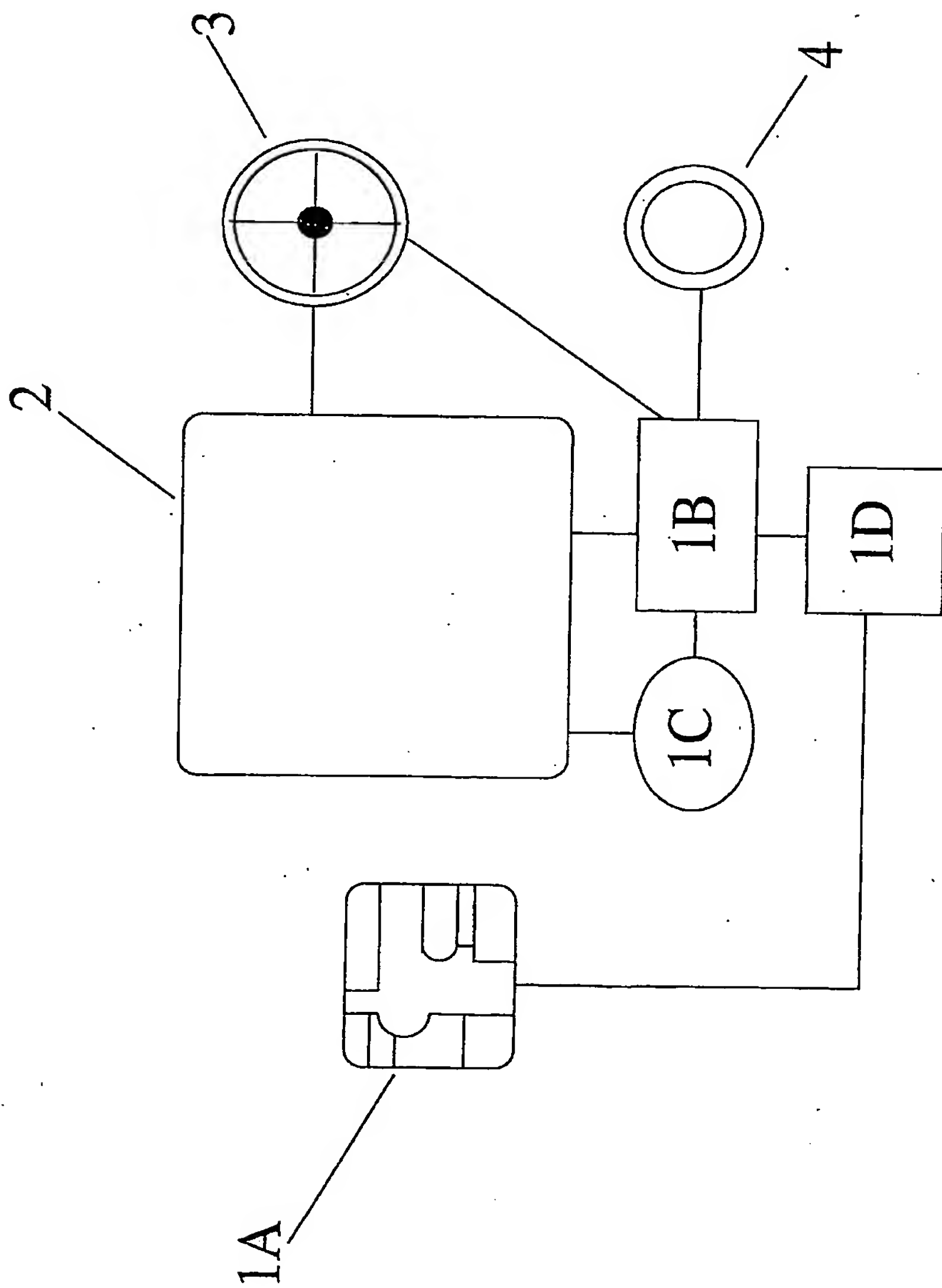


Fig.4

A Compact Electronic Activity Reminder Device

The invention relates to a portable electronic personal activity reminder device. The particularly important example of the invention usage as an appointment reminder is described in detail.

The inefficiency and cost associated with missing appointments are an important concern to many service providers that allocate scheduled appointments to their clients. Increasingly, some service providers are utilising electronic means such as emails, mobile phone text messages and direct telephone calls to remind the client of imminent appointment. All these methods have some obvious significant cost and implementation disadvantages e.g. not everyone has a PC or mobile phone, nor wish to be contacted by telephone.

Many organisations are already using ISO 7816 type Smart cards for a variety of usage, such as storing records, authentication and e-commerce transactions. The object of this invention is an activity reminder device utilising Smart Card technology. The invention is essentially a smart card incorporating an acoustic speaker, and optionally, a visual alert interface that can also act as an appointment or other activity alert reminder device. The advantages of using the smart card for incorporating an appointment reminder application are its compactness, easily programmable with time sensitive data and control programs, familiarity and relevance to existing smart card applications, and convenience of building on existing smart card technology and standards, which are well established. The invention is therefore compact, relatively inexpensive, and potentially multi-functional and can be adopted and issued to clients by many types of service provider e.g. hospital departments, various healthcare providers such as dentist and GP surgeries, private businesses that regularly allocate appointments. Other applications where a reminder alert is useful include reminding patients to take medicine in time, and reminding parole prisoners to carry out certain time based duties.

It should be noted that Smart cards incorporating an acoustic interface are already being marketed under trade names such as AudioSmartCard and VocaliD. However,

all these cards are designed exclusively for access authentication and/or secure e-payment purposes only. These cards are not designed or have the technical facilities to perform as an activity reminder device. The current invention contains significant innovative features in the applications and specifications of a new type of acoustic smart card, namely "an activity reminder acoustic smart card" which are described below.

The generic form of the invention comprises: -

- a) a very thin and compact, portable device with time clock to trigger one or more events (e.g. alarm alerts) according to pre-programmed data and instructions.
- b) means for setting the time clock and the event times from a remote terminal, and if necessary means to alter other data or programs in the invention device.
- c) means for creating an audible sound, vibration or electromagnetic radiation as forms of reminder alert.
- d) means to control functions e.g. to turn off alarm
- e) a compact power source, and
- f) for more advanced version, the ability to display and alter information held in the said device.

A particular form of this invention involves the use of Smart Card technology i.e. complying with ISO 7810 and ISO 7816 standards for the physical dimension and electrical interface layout of the device respectively. Detailed description of this invention and several of its embodiments with additional features are given below:

The essential component features of the invention comprise a programmable integrated circuit microprocessor Smart Card with an onboard clock and memory integrated circuit that are linked to a flat speaker (e.g. a piezoelectric audio transducer) that can give out an audio alarm. Depending on the specification of the components used in the invention, the audio alarm could be emitting voice information as well as just some basic intermittent tone sound to alert the users. In addition to the audio alert, the invention may also incorporate an electromagnetic wave emission alert, such as a visual alert via the use of LEDs or protruding optical fibres. As this invention is an active device, it needs to be powered by an ultra-thin flat battery that would fit inside an ISO-standard smart card. Such battery with sufficient capacity and

specifications to work within the existing invention is now widely available via a number of high-technology battery producing companies such as Power Paper Ltd in Israel. There is also a function button so the card user can deactivate the alarm when it is on, or press it to activate some other pre-programmed functions. The function button would be designed to prevent accidental activation e.g. a touch sensitive flat button or some switch that is embedded inside the card. Having programmed the card with the appropriate Appointment Reminder Protocol, the service provider would simply issue such a card to their client who has an appointment, incorporating the essential appointment time data and indeed any other useful information (e.g. update clock/date) inputted to the client's card by the usual method of 'swiping' the Smart card through a Smart card reader (note, it is generally understood that a Smart card reader can read as well as write data to a Smart card). The Smart card reader may be connected to a PC already used by the service provider who issues the appointment, or it could be bought as a standalone device that has its own keypads, so that appropriate information (e.g. appointment times) can be written to the card. Alternatively, information data may also be exchanged remotely, if the card is of contact-less type. The inputted information such as the appointment time would thus inform the card to activate its appointment reminder alarm or message at predetermined times prior to the appointment in accordance with the appointment reminder protocol program that is stored inside the card. An example of a particularly effective and innovative appointment reminder protocol is given later following the description for Figure 1.

The activity reminder acoustic smart card will be readily re-usable as further or new additional appointments can be similarly programmed via a smart card reader or remotely if the card is of the contact-less type. Furthermore, in the future, when major service providers develop their electronic (appointment) booking program, it can be envisaged that the most up to date booking information can be readily accessed and/or updated on the client's activity reminder acoustic smart card via the service provider's e-booking website: the client enters the service provider's e-booking website, confirms their identity online (which could be via the activity reminder acoustic smart card which may also contains authentication details, or via the traditional password method) and simply update data in his/her activity reminder acoustic smart card through a smart card reader that are linked to the client's own

personal computer. Note, many PCs can now be purchased with integrated Smart card reader, and it is expected that increasing more new PCs will acquire this facility as standard. The ability to update (download and upload) information online is especially useful as some appointments are rescheduled.

Although, the current activity reminder acoustic smart card has many distinct features compare to the authentication type acoustic smart card, the manufacturing of both types would be similar (see for example patent no. WO0139113 for the fabrication details of an authentication card incorporating a piezoelectric element). Unlike the authentication card, the current invention has the potential to become a mass-market device, due to its more popular application needs. Thus the cost of individual non-personalised card could become extremely affordable. Furthermore, the cost of the card could be reduced further by having adverts printed on it. Another promotional and application of the current invention is that it can be designed as a business card that has the capability to remind clients of important events.

Several embodiments and further details of the invention will now be described with reference to the accompanying drawings in which:

FIGURE 1: This shows a plan view of a basic activity reminder acoustic smart card, with its essential features.

FIGURE 2: as Figure 1, plus featuring a visible LED light source at the upper edge of the smart card.

FIGURE 3: as Figure 2, except the LED has been replaced by a strand of optical fibre.

FIGURE 4: This shows a schematic layout of the electronic components of a basic activity reminder acoustic smart card as described for Figure 1.

As shown in Figure 1, the activity reminder acoustic smart card consists of the following essential features; the main microprocessor unit with an onboard clock and memory integrated circuit 1, an ultra thin flat battery source 2, a flat audio/alarm transducer 3, and a function button 4. Note some of these key features are usually not

visible in an actual embodiment of the invention: for example, the key number 1 as pointed by the arrow is actually the contact interface; the main microprocessor unit, clock and memory integrated circuit are embedded inside the card.

For the purpose of illustration, also shown in Figure 1 are some common features that may be found on the front side of a typical smart card, e.g. the card number, valid dates and names of card issuer and card holder. For clarity, these features and other optional features such as security holograms, magnetic stripe and signature panel are not illustrated in Figure 1 or the other figures, as they are not essential in the description of the invention. It is also assumed that the card could be of the contact-less type i.e. information can be read or write to the card without direct contact with a smart card reader. In this type of card, a RF antenna is built inside the card, which is normally hidden from view. It is also understood that the card (front and back) may contain essential text or artwork information which are useful in the use of the invention e.g. service provider names and contact details, instruction on how to use the card, meaning of the sound effects, expiry date of card, adverts or the name of a sponsor etc.

The invention as shown in Figure 1, can be carried by the card holder along with his/her other credit size cards, acting as extra reminder to a paper appointment card, or that it can actually be attached in a non-permanent way (e.g. corners tugged securely behind slits in the paper appointment card or letter) with the usual paper appointment card or letter. The advantage of the latter usage is that the acoustic activity reminder smart card when it sounds its alarm may also act as an appointment card/letter locator, since research have shown that many paper appointment card/letter are frequently mislaid within the house, thus resulting in more frequent missed appointment. Another useful feature that may be incorporated in the design of the activity reminder acoustic smart card is the attachment of a magnet to the back of the card, so that the card may be readily affix to a metallic surface (e.g. on fridge or metal filing cabinet) in an area where it can be readily heard or seen when the reminding alert is activated.

An important part of the activity reminder acoustic smart card is the application software to instruct the device. One of the greatest advantages of incorporating smart

card technology in the invention is the relative ease and flexibility to develop bespoke programs to suit the demand of individual organisations, and even the demands of individual clients. For example, in using the invention as an appointment reminder device, the software may utilise the following innovative Appointment Reminder Protocol, which has been designed with much consideration to the average user, in terms of effectiveness and minimising nuisance factor:

A first reminder alarm will sound at least 2 days before the actual appointment date, followed with a second reminder call alarm on the morning of the appointment date. The first reminder alarm is to enable the cardholder to offer sufficient warning time to the service provider in the event that the cardholder needs to alter the original appointment time. The first reminder alarm will always start only in the late afternoon, or early evening, so as not to be confused with the second reminder alarm which will start in the early morning on the date of the appointment.

The reminding alarms will be of a low intensity sound (e.g. beeps, chirps etc) repeated at a low intermittent frequency rate for a prolonged period (e.g. up to 30 minutes) or until it is turned off manually by pressing the function button 4. Compared to other alarm calling methods, this low intensity, low frequency and long reminding alarm duration protocol has the following advantages i) low power consumption ii) the long period of the alarm call ensures maximum effectiveness of the user hearing the alarm and iii) the low intensity and frequency of the reminding beeps prevent and minimises an annoyance condition to the card owner and other nearby people should the former not be able to immediately deactivate the alarm (e.g. whilst driving to work).

Additional utilities on the same reminder device can be realised by offering different reminding alarm sounds for different types of appointment (e.g. doctor, dental, hairdresser etc.), with printed instructions at the back of the card to inform card owners of the meaning of the different sounds. Hence, potentially different departments or even totally different organisations can utilise the same card, provided a set of standard protocols are adhered to. To suit the needs of the particular service provider, the exact detail of the appointment reminder protocol described above could of course be readily changed by changing the program or the parameters within it.

Note the above appointment reminder protocol assumes only a basic specification of the device, where the audio alarm is not capable of speech. If the device is capable of giving speech information, then obviously more useful applications and alarm protocol can be written for the device. For example, the time of the next appointment can be revealed verbally when the function button 4 is pressed at any time. Alternatively, pressing function button 4 at any time may activate a particular alarm sequence to indicate if there is any imminent activity (such as an appointment) within a particular set period.

Figure 2 shows another embodiment of the activity reminder smart card which incorporates one or more electromagnetic wave emission source, 5. In this particular example, the source 5 is shown as a Light Emitting Diode (LED). The light will light up or flash when the audio alarm is on, or it may function under other situations depending on the programme criteria. The LED(s) may be positioned anywhere on the card, although it is shown here at the edges of the long side of the card for optimal visibility as the card may be carried in a handbag or wallet. The light covers or the actual light source may be of different colours to enable more utilities. One advantage of this additional feature is for providing extra awareness of the situation when the alarm is on, or to assist a person with hearing difficulties.

Besides using the invention as an appointment reminder, the invention could be used as a reminder for patient to take medicine and other powerful applications such as in the security area, in which two examples are described below. The essential components shown in Figure 2 could be incorporated in a smart card used for access authorisation or e-commerce transactions. For example, a cardholder leaving a secure area is required to lock a door within a programmed period. If the card holder forgets to lock the door within a programmed period, then the security system in the secure area will send an electromagnetic waves instruction to a contact-less version of the card, which will then emits an audio and/or visible alarm to remind the user to act appropriately e.g. lock the door. In addition, the card may also emit invisible electromagnetic waves to a receiver in the building to alert other relevant people. The other example involves the invention components being adopted in credit cards. In this case, an audio alert and/or LED light would flash or light up to indicate or warn a retailer that the transaction requested is valid or invalid.

Figure 3 shows another embodiment of the invention that uses a visual alert. Instead of a visible LED light source on the surface of the card, the original light source which may be a LED is now embedded inside the card. The light is transmitted to outside the card via a strand of one or more flexible optical fibres, 6. The optical fibre protrudes either vertically, 6 as shown in figure 3 or horizontally out of one the edges of the card. The advantage here is that the light would be more easily spotted in some circumstances when a card may be stored in a limited visibility compartment inside a wallet or handbag.

Figure 4 shows an example of a schematic electrical connection between the main electronic components described in Figure 1, where 1A is the contact interface, 1B is the main microprocessor, 1C is the onboard clock, and 1D is the onboard integrated memory. As are indicated in the previous figures, the battery, acoustic speaker interface and the action button are indicated by the numbers 2, 3, and 4 respectively. Note the integrated memory 1D can be of a non-volatile memory component type to hold relevant long-term information such as the Appointment Reminder Protocol program and the appointment time data, which will minimise power consumption. Furthermore, since the activity reminder acoustic smart card is an active device, then depending on the actual details of the circuit design, an isolation circuit may be required for the card to work with a standard Smart card reader that normally works with a passive smart card.

Finally, we describe another embodiment of the invention that take into account increasingly economic production developments whereby the above embodiments can be made more powerful and flexible by including two additional advanced features built into the card. The new features are an electronic display, and one or more keypads to allow altering or updating existing information inside the card. For simple and efficient information updates, a minimum of two keypads can accomplish the task, providing the software is written to allow one keypad to scroll through the list of option, and the other keypad to confirm the current selection or to return to the previous selection. The electronic display can show the relevant information about appointment time, and/or any other relevant information that would be useful to the operation of an activity reminder device. To fabricate an economically viable device with these new

features using current mass market production technology, the thickness of the invention may need to increase by two or more times of the ISO dimension standard for smart card. In this case, LCD or organic OLCD is a viable display option.

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Date of mailing (<i>day/month/year</i>) 30 March 2005 (30.03.2005)	
Applicant's or agent's file reference JCB/P109134WO	IMPORTANT NOTIFICATION
International application No. PCT/GB05/000212	International filing date (<i>day/month/year</i>) 21 January 2005 (21.01.2005)
International publication date (<i>day/month/year</i>)	Priority date (<i>day/month/year</i>) 24 January 2004 (24.01.2004)
Applicant	KAM, Kin, Fai

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<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
24 January 2004 (24.01.2004)	0401575.6	GB	17 February 2005 (17.02.2005)
29 April 2004 (29.04.2004)	0409531.1	GB	17 February 2005 (17.02.2005)
14 September 2004 (14.09.2004)	0420397.2	GB	17 February 2005 (17.02.2005)

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